



Fruit and Vegetable Consumption in South Dakota: Findings from the Behavioral Risk Factor Surveillance System (BRFSS)

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Timeline and Background

- September 2010 MMWR published
 - South Dakota has lower consumption compared to other states
 - Trends show South Dakota has experienced recent declines as of 2007
- Spring 2011 BRFSS analysis and discussions
 - SDDOH staff analyze BRFSS data to understand why consumption is low
 - BRFSS data show some patterns but do not explain why we are low
 - Recommend in-depth study and data collection to understand why
- Fall 2011 Eight focus group interviews completed
- December and January 456 phone interviews completed
- April 18, 2012...we are here today to present the findings and discuss how to increase fruit and vegetable consumption in South Dakota

State-Specific Trends in Fruit and Vegetable Consumption Among Adults — United States, 2000–2009

A diet high in fruits and vegetables can reduce the risk for many leading causes of death (1–3) and can play an important role in weight management (4). *Healthy People 2010* objectives for fruits and vegetables include targets of increasing to 75% the proportion of persons aged ≥ 2 years who consume two or more servings of fruit daily and to 50% those who consume three or more servings of vegetables daily.* To assess states' progress over the past decade in meeting these targets among adults and to provide an update of the 2005 subgroup estimates (5), CDC analyzed data from the Behavioral Risk Factor Surveillance System (BRFSS). This report describes the results of that analysis, which indicated that, in 2009, an estimated 32.5% of adults consumed fruit two or more times per day and 26.3% consumed vegetables three or more times per day, far short of the national targets. Overall, the proportion of adults who met the fruit target declined slightly, but significantly, from

module was included in the core survey: 2000 (N = 179,139), 2002 (N = 238,852), 2003 (N = 255,657), 2005 (N = 347,278), 2007 (N = 420,217), and 2009 (N = 420,968). Median survey response rates by state, calculated using Council of American Survey Research Organizations (CASRO) guidelines,[†] were 48.9% (range: 28.8%–71.8%) for 2000 and 52.5% (range: 37.9–66.9%) for 2009. Median cooperation rates were 53.2% (range: 35.5%–77.7%) for 2000 and 75.0% (range: 55.5%–88.0%) for 2009.

For each survey year, prevalence estimates were weighted to the respondent's probability of being selected for the age-, race-, and sex-specific distributions for the state based on U.S. Census data. Logistic regression analysis was used to assess temporal changes in consumption during 2000–2009, including year as a continuous variable and controlling for changes in state distributions of age through standardization to the 2000

next questions are about the foods you usually eat or drink. Please tell me how often you eat or drink each one, for example, twice a week, three times a month, and so forth. How often do you..." 1) "...drink fruit juices such as orange, grapefruit, or tomato?" 2) "Not counting juice, how often do you eat fruit?" 3) "...eat green salad?" 4) "...eat potatoes, not including French fries, fried potatoes, or potato chips?" 5) "...eat carrots?" 6) "Not counting carrots, potatoes, or salad, how many servings of vegetables do you usually eat?" Consumption was divided by 7 for weekly frequencies, 30 for monthly frequencies, and 365 for yearly frequencies to calculate daily consumption. Total daily consumption of fruit was the sum of responses to questions 1–2 and vegetables the sum of responses to questions 3–6. Participants were not given a definition of serving size. To be consistent with previous reports, respondents who did not answer all six questions and those who reported consuming fruits and vegetables 25 or more times per day were excluded ($n = 24,652$ for 2009) from the final sample.

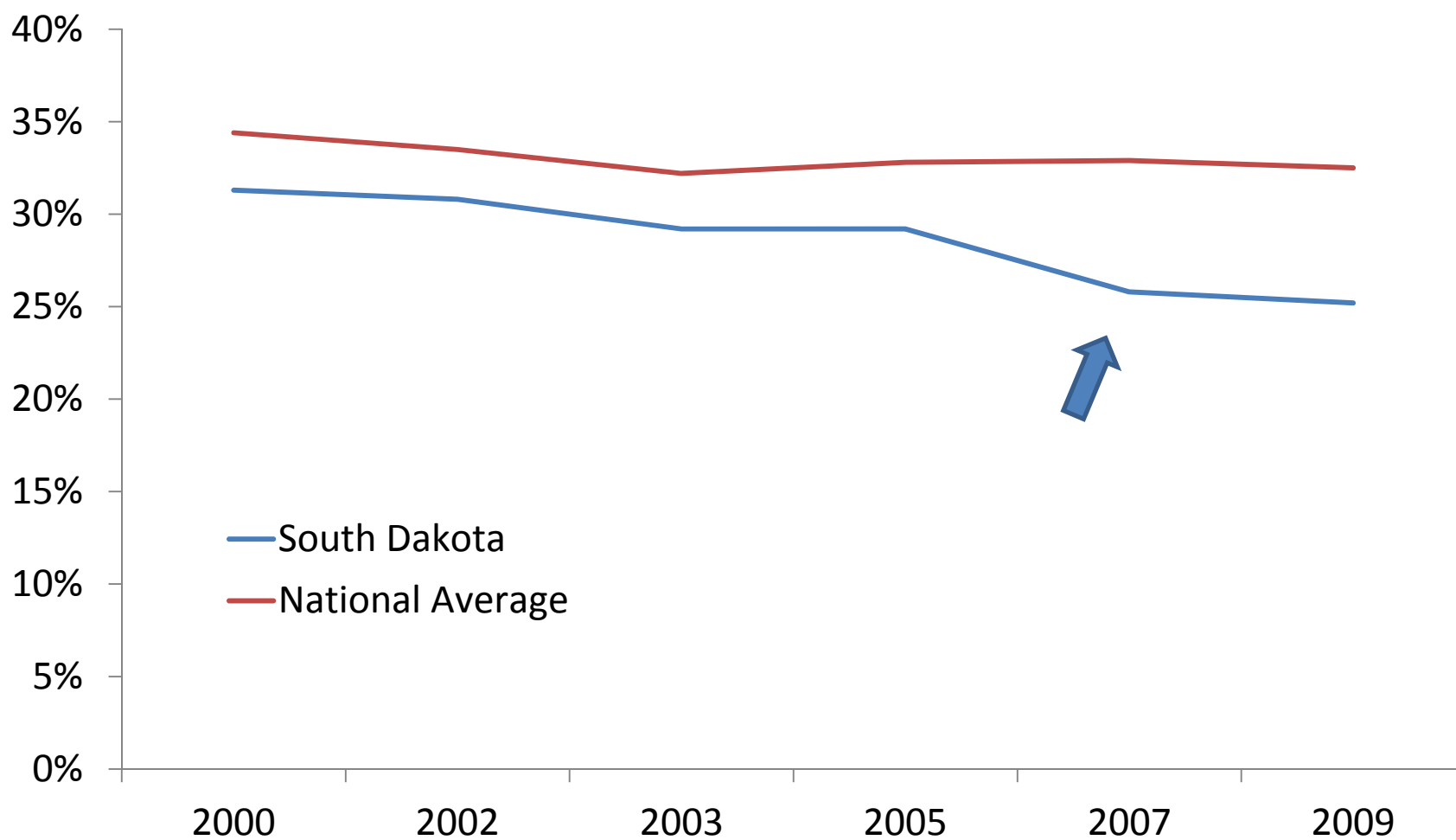
In 2009, an estimated 32.5% of U.S. adults consumed fruit two or more times per day (Table 1), with the highest percentage in DC (40.2%) and the lowest in Oklahoma (18.1%). The percentage of adults who consumed vegetables three or more times per day

was 26.3%, with the highest percentage in Tennessee (33.0%) and the lowest in South Dakota (19.6%).

Thus, no state met either of the *Healthy People 2010* targets related to fruit and vegetable consumption among adults. Twelve states and DC had 35%–45% of adults who consumed fruit two or more times per day, compared with no states that had 35%–45% of adults who consumed vegetables three or more times per day (Figure).

From 2000 to 2009, the overall prevalence of consuming fruit two or more times per day decreased slightly, but significantly, from 34.4% to 32.5% (Table 1). Slight but significant increasing linear trends for fruit consumption were observed in four states, decreasing trends in 22 states and DC, and no significant change in 24 states. The prevalence of consuming vegetables three or more times per day did not change significantly during this period (26.7% in 2000 and 26.3% in 2009). Slight but significant increasing trends were observed in 11 states and DC, decreasing trends in 14 states, and no significant change in 25 states. Idaho was the only state that had significant, although slight, increases in both fruit and vegetable consumption, whereas 10 states had slight but significant decreases in both proportions.

Percent of Adults Consuming Two or More Servings of Fruit per Day



Percent of Adults Consuming Three or More Servings of Vegetables per Day

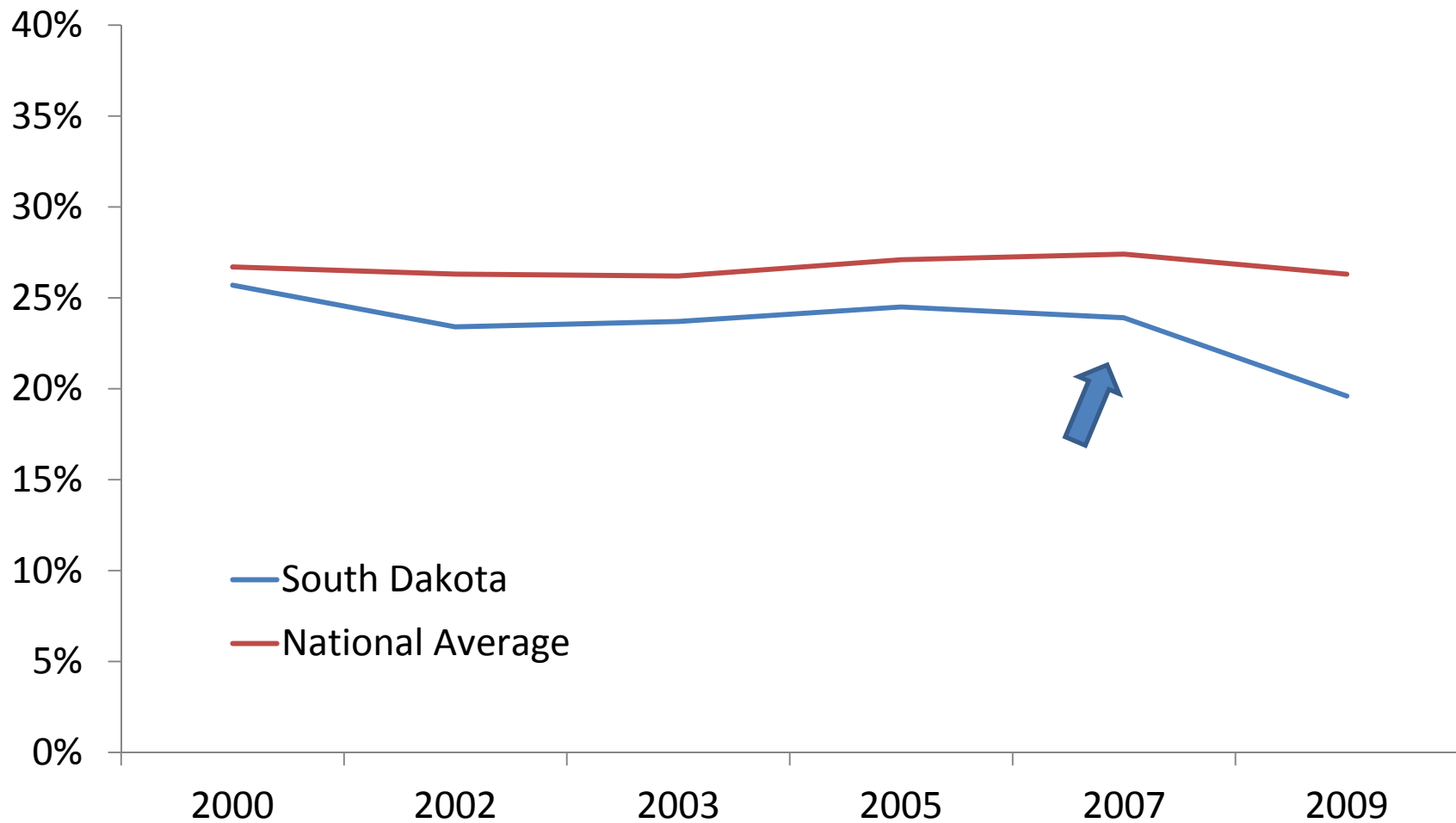
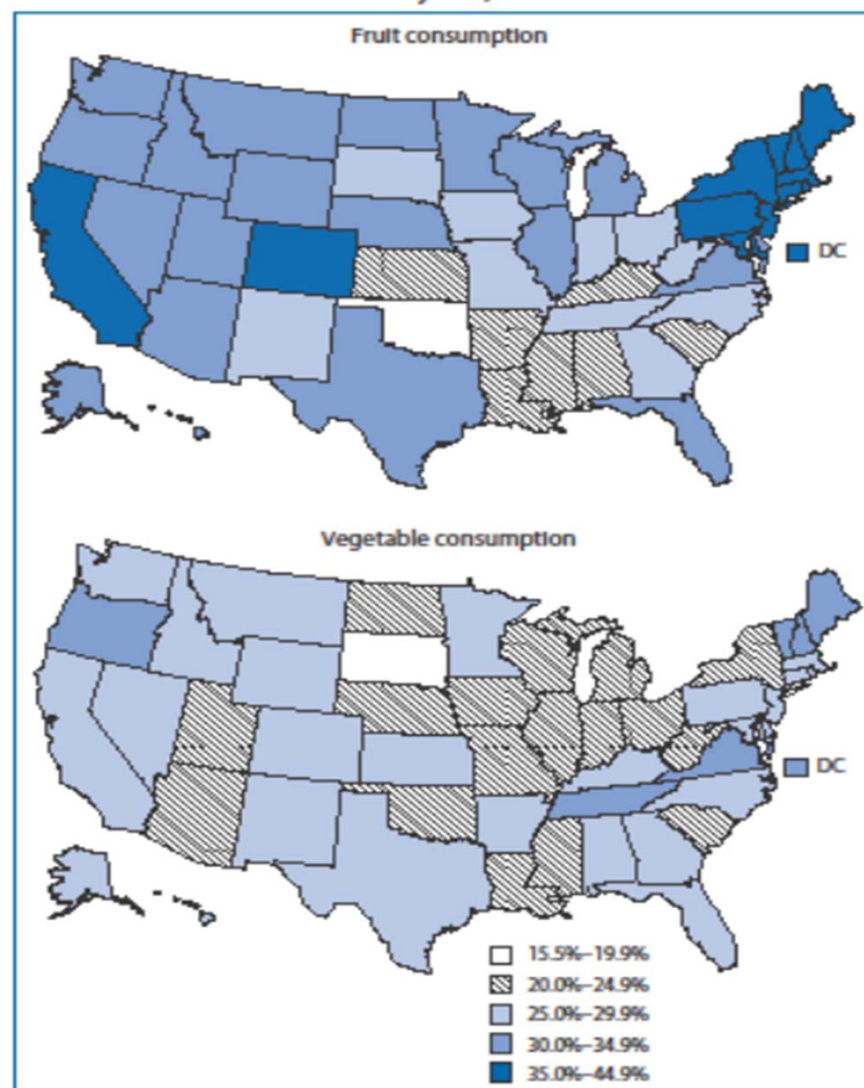


FIGURE. Percentage of U.S. adults aged ≥ 18 years who consumed fruit two or more times per day* and vegetables three or more times per day,[†] by state — Behavioral Risk Factor Surveillance System, 2009



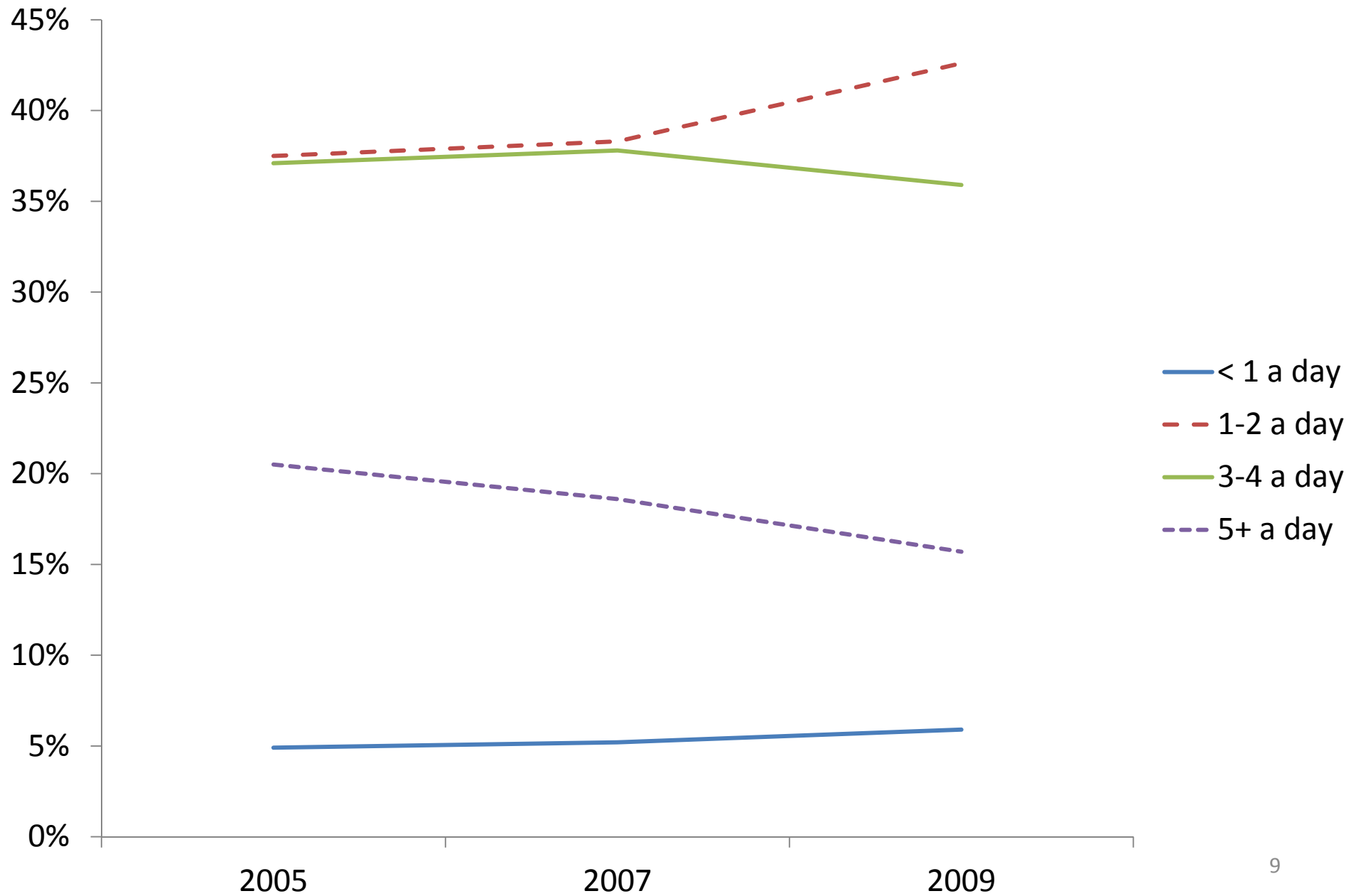
*Healthy People 2010 target for increasing to 75% the proportion of persons consuming two or more servings of fruit daily (objective 19-5).

†Healthy People 2010 target for increasing to 50% the proportion of persons consuming three or more servings of vegetables daily (objective 19-6).

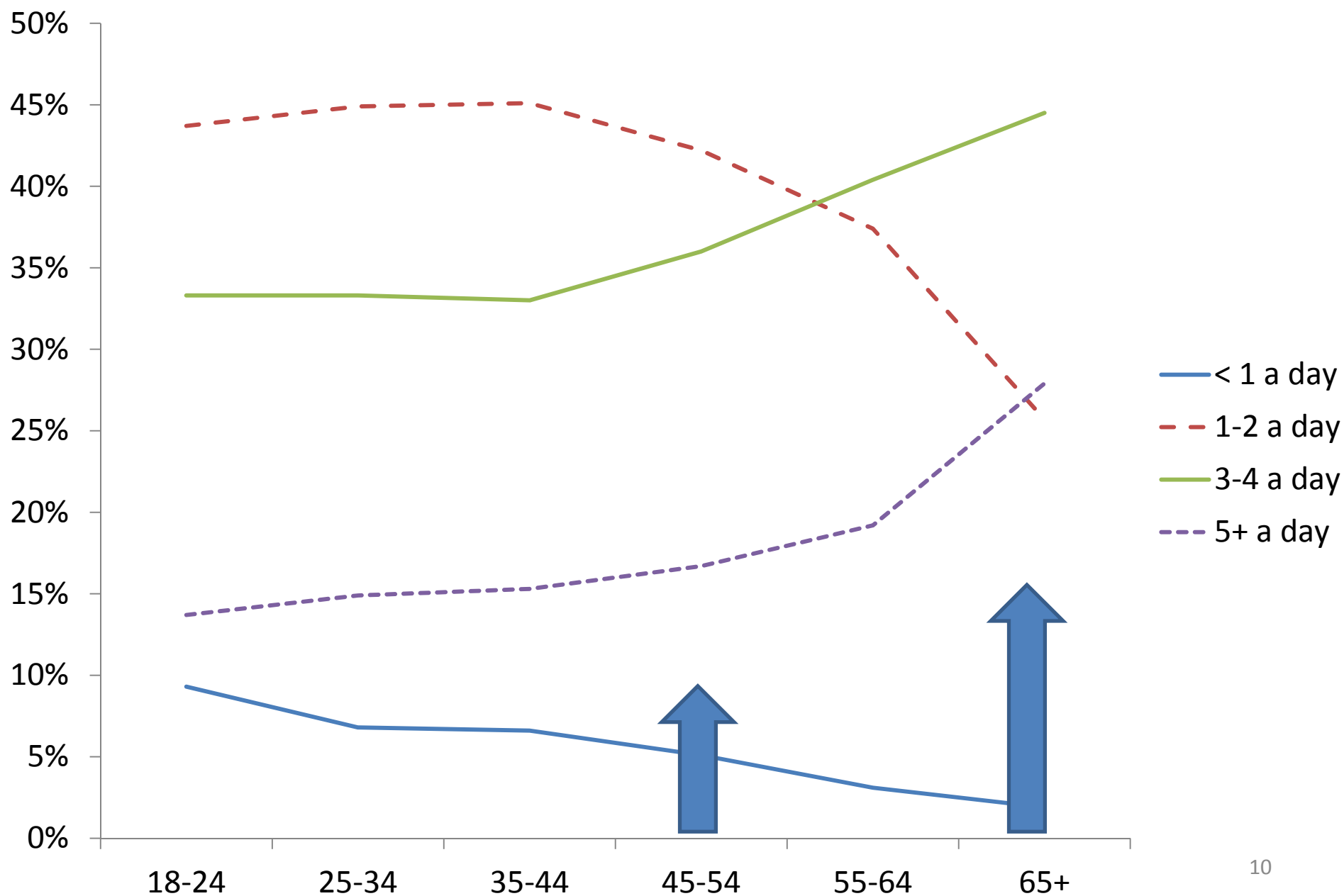
Taking on the challenge

- As a result of the MMWR report SDDOH has taken on the challenge to understand why fruit and vegetable consumption is low in our state, and what can be done to increase consumption statewide
- Spring 2011: BRFSS data were analyzed to learn how fruit and vegetable consumption is related to age, gender, smoking, obesity, physical activity, education, and income

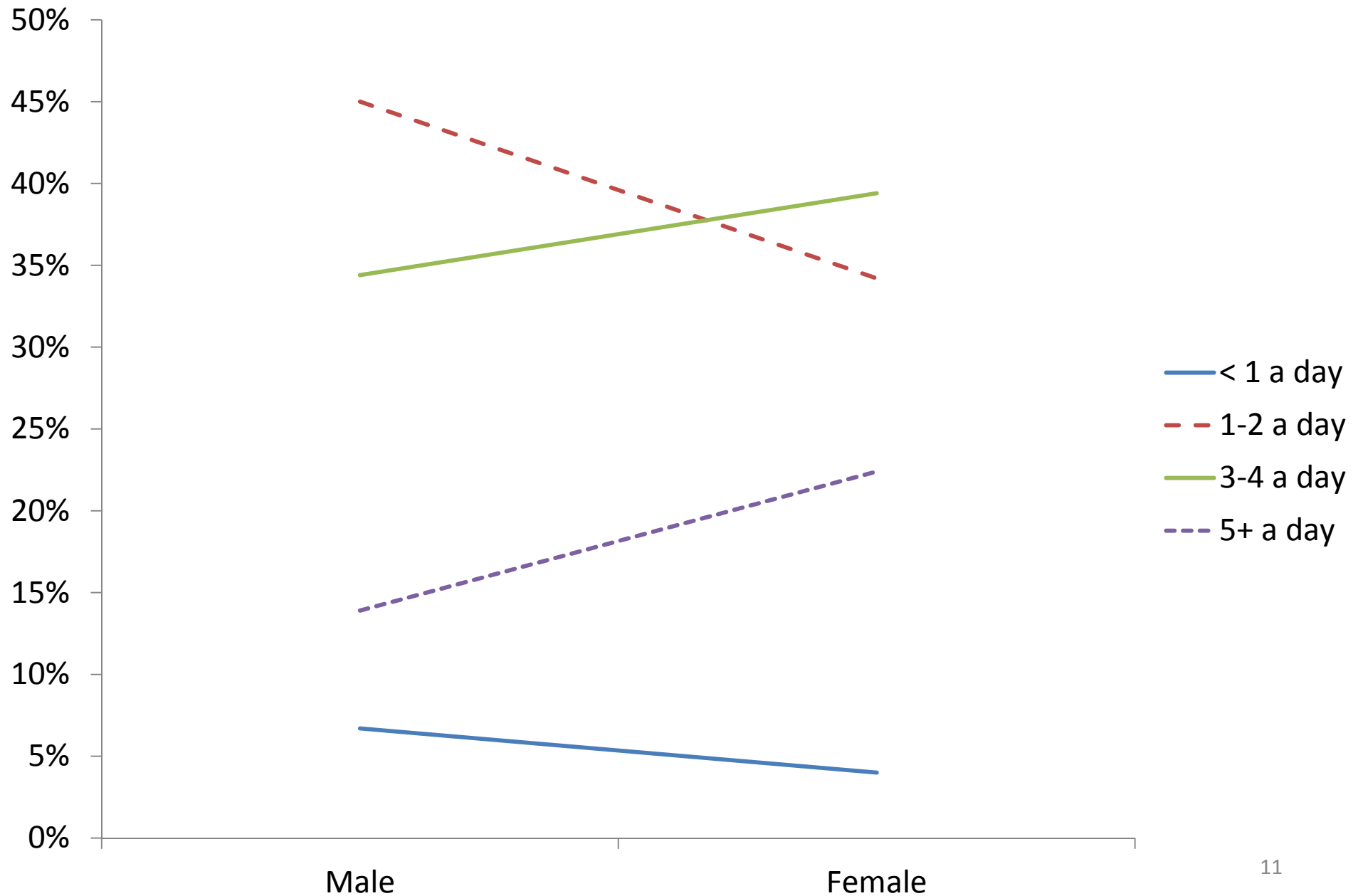
Percent of South Dakotans that Consumed Different Numbers of Fruit and Vegetable Servings Per Day 2005-2009



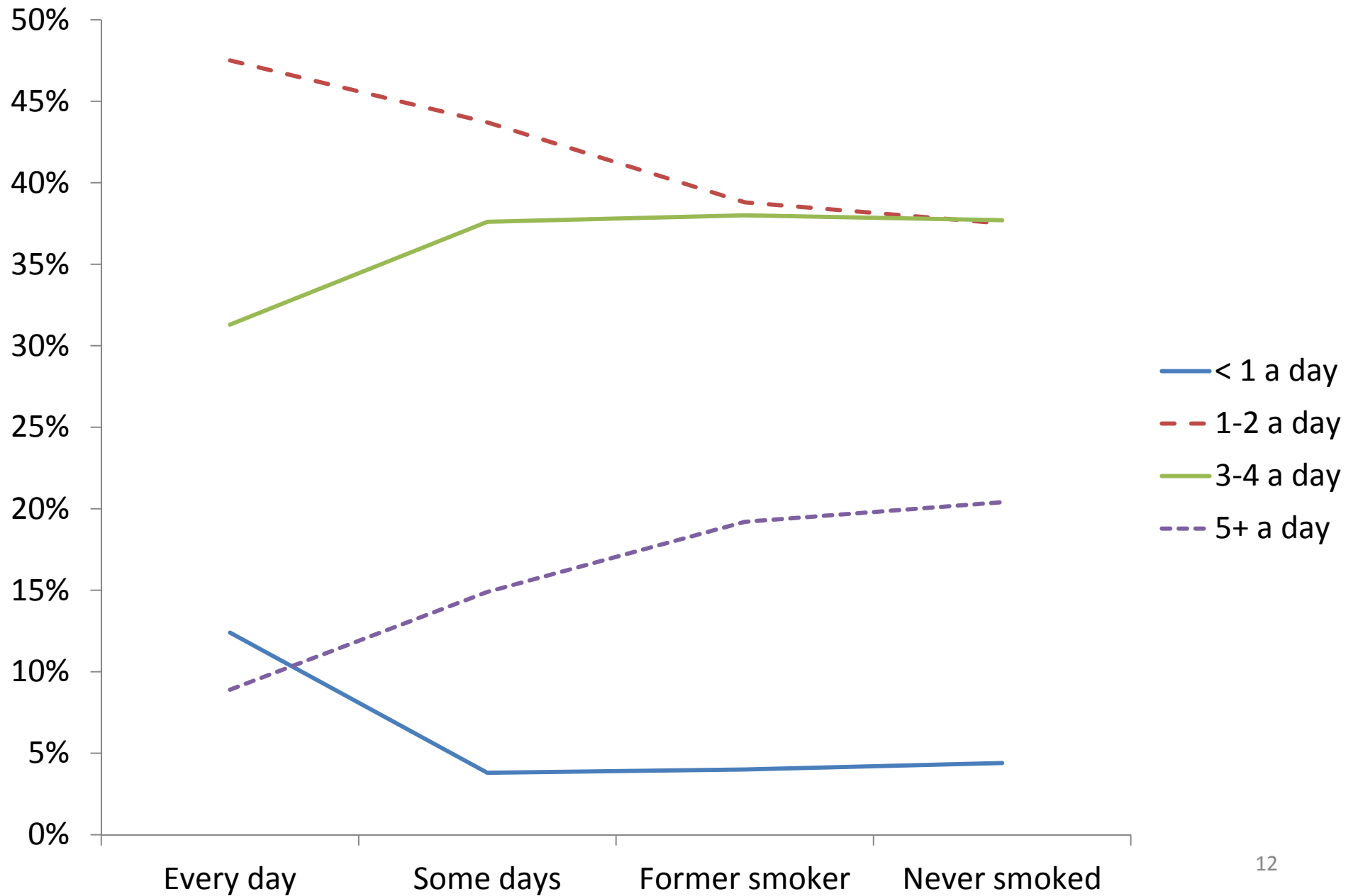
Percent of South Dakotans that Consumed Different Numbers of Fruit and Vegetable Servings Per Day by Age Group 2005-2009



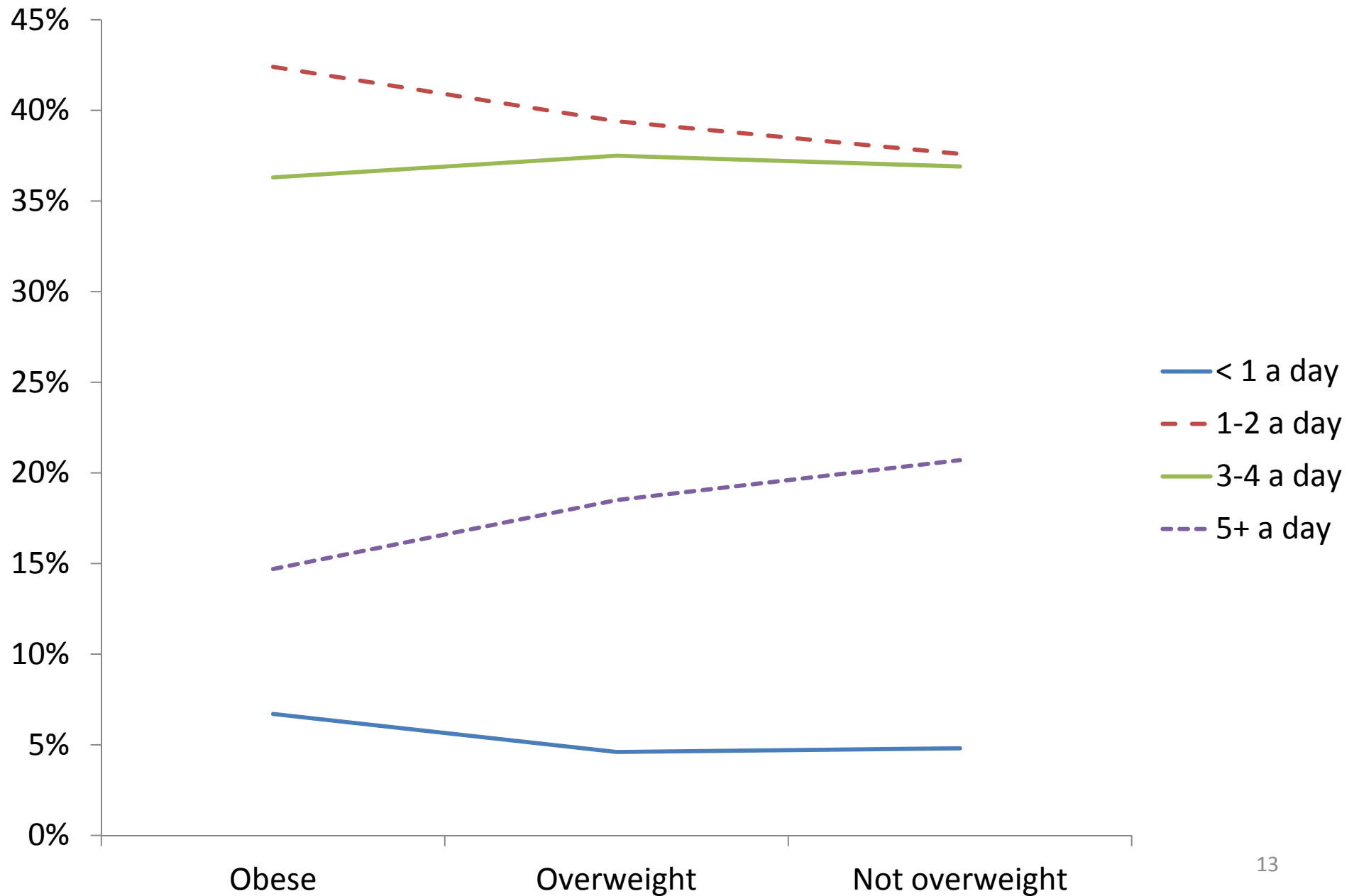
Percent of South Dakotans that Consumed Different Numbers of Fruit and Vegetable Servings Per Day by Male/Female 2005-2009



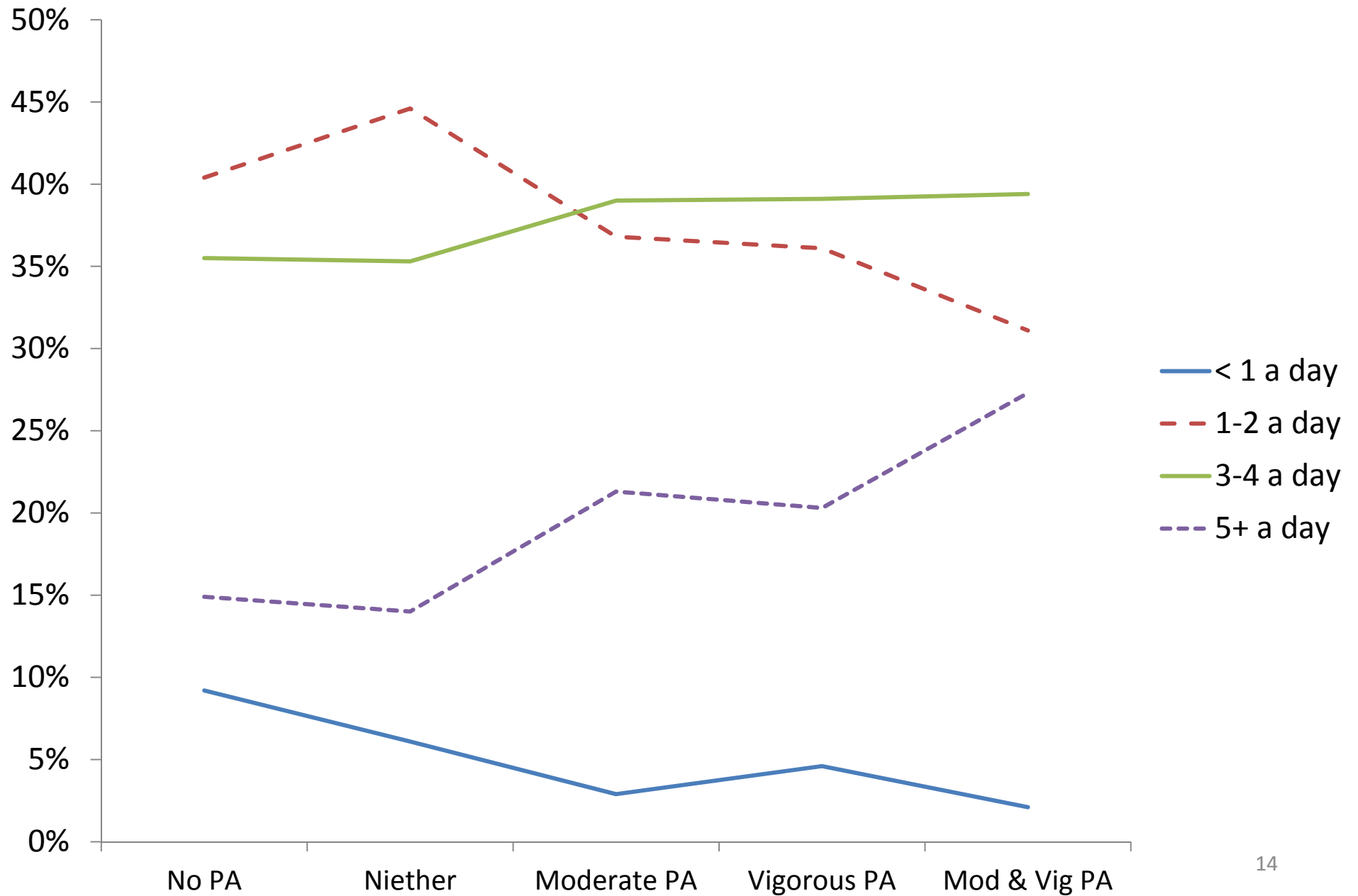
Percent of South Dakotans that Consumed Different Numbers of Fruit and Vegetable Servings Per Day by Smoking Status 2005-2009



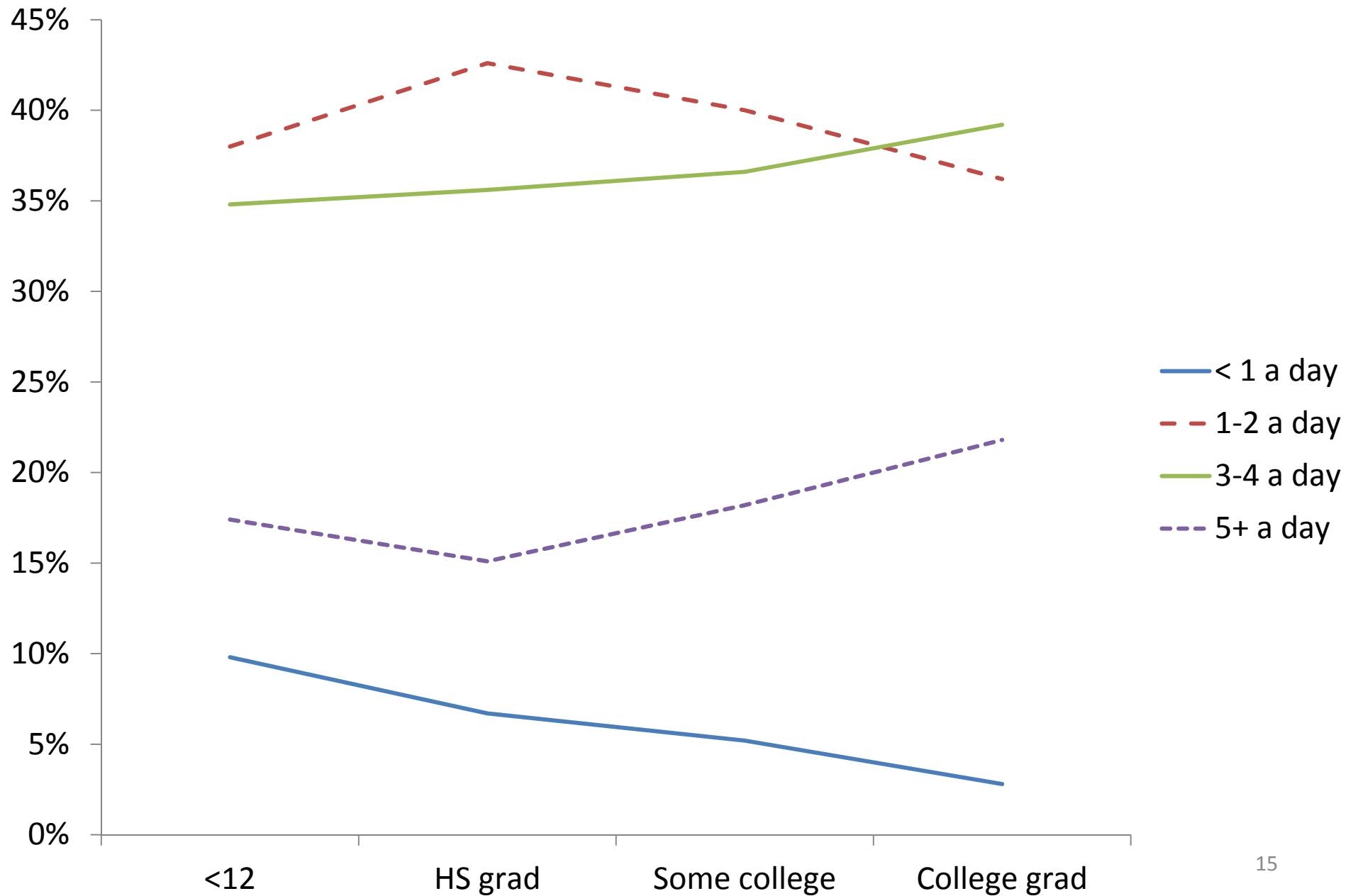
Percent of South Dakotans that Consumed Different Numbers of Fruit and Vegetable Servings Per Day by Weight Status 2005-2009



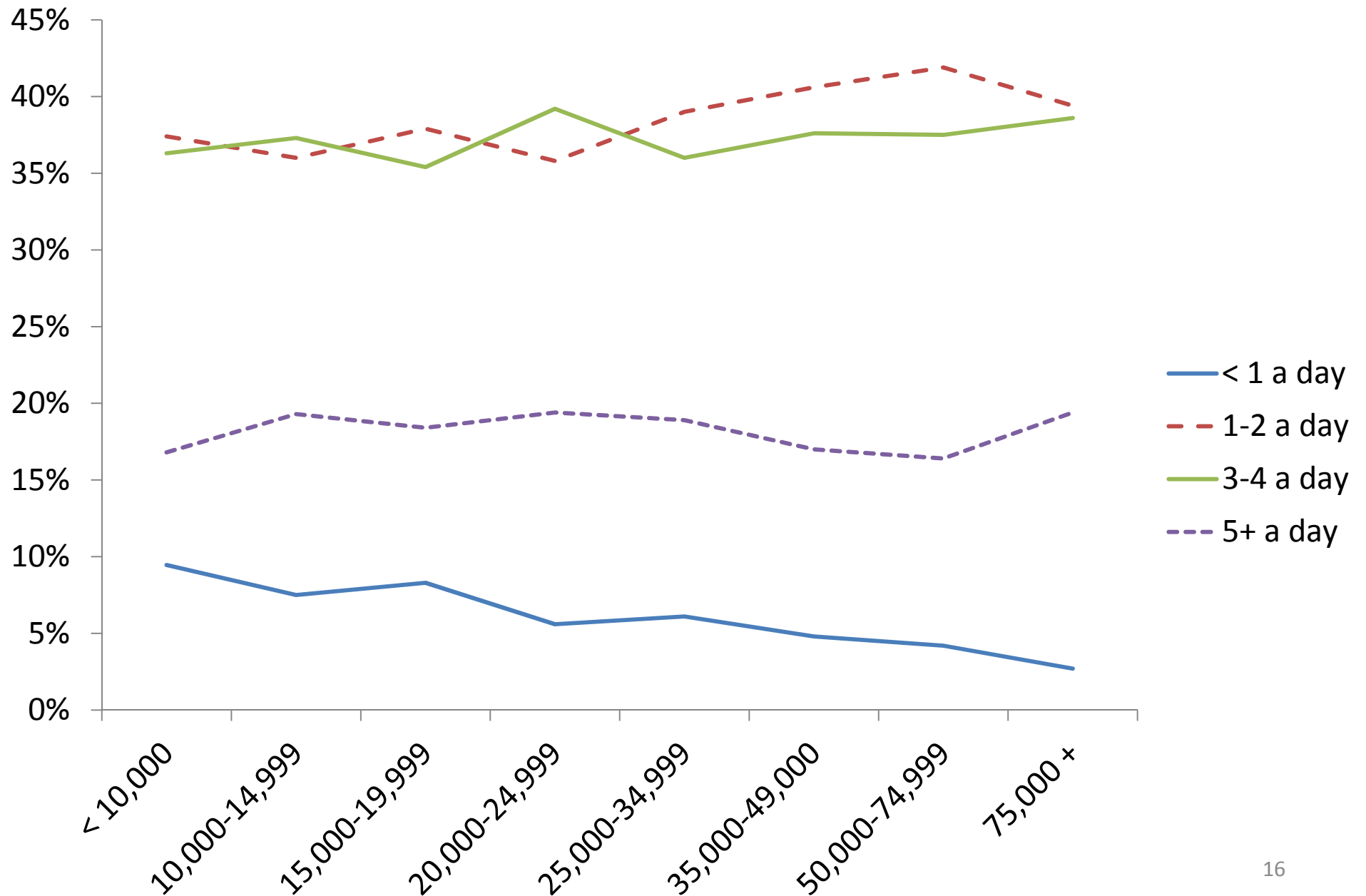
Percent of South Dakotans that Consumed Different Numbers of Fruit and Vegetable Servings Per Day by Physical Activity 2005-2009



Percent of South Dakotans that Consumed Different Numbers of Fruit and Vegetable Servings Per Day by Education Group 2005-2009



Percent of South Dakotans that Consumed Different Numbers of Fruit and Vegetable Servings Per Day by Household Income 2005-2009



BRFSS Consumption Summary

More Consumption	Less Consumption
The physically active	Smokers
Older adults	Younger adults
Higher educated	The physically inactive
Healthy weight	Obese
Non smokers	Lower Education
Females	Males

Questions?

Table 1
Estimated Percentage and Number of Persons at Risk Due to Selected Factors (Ages 18 and Older Unless Otherwise Specified): South Dakota BRFSS, 2009

Risk Factor	Estimated % at Risk	Estimated Population at Risk
Body Mass Index - Overweight/Obese (BMI 25.0+)	67.1%	411,000
Body Mass Index - Obese Classes I-III (BMI 30.0+)	30.3%	186,000
Body Mass Index - Obese Classes II-III (BMI 35.0+)	10.4%	64,000
No Leisure Time Physical Activity	24.5%	150,000
No Moderate Physical Activity	55.0%	337,000
No Vigorous Physical Activity	76.1%	466,000
Less Than Five Servings of Fruits and Vegetables	84.3%	517,000
Cigarette Smoking	17.5%	107,000
Smokeless Tobacco Use	6.2%	38,000
Diabetes	7.3%	45,000
Hypertension	29.9%	183,000
High Blood Cholesterol	36.4%	223,000
No Health Insurance (18-64 Years Old)	8.2%	41,000
No Health Insurance (0-17 Years Old)	2.1%	4,000
No Health Insurance (0-64 Years Old)	6.5%	45,000
No Flu Shot in Past 12 Months (65+ Years Old)	25.0%	29,000
Never Had a Pneumonia Shot (65+ Years Old)	33.8%	40,000
Haven't Been to the Dentist in the Past Year (1-17 Years Old)	18.0%	34,000
Drank Alcohol in Past 30 Days	59.6%	365,000
Binge Drinking	19.3%	118,000
Heavy Drinking	4.0%	25,000
Ever Had a Heart Attack	4.1%	25,000
Have Angina or Coronary Heart Disease	3.9%	24,000
Ever Had a Stroke	2.3%	14,000